Cecidology.—Among the most important of the foreign contributions is a paper by KARNY,[20] in which the author describes a large number of gall-making *Thysaneura*, including a number of new species. However, the emphasis is placed upon the animal rather than the plant side of the subject.

A most excellent paper by HOUARD[21] on the galls of French West Africa gives descriptions of 51 new species of gall-makers on 29 species of host plants. The author describes both insect and cecidia and in most cases gives illustrations of the cecidia. The grouping is with reference to the plants, a practice which is apparently growing in favor with the students of cecidology.

Root nodules are the subject of two papers. Miss SPRATT[22] discusses the root nodules on the Podocarpineae which are caused by *Pseudomonas radicicola*. These nodules are modified lateral roots. The organism penetrates the root-hairs and then the cortex, and the stimulus is in the meristimatic tissue, but there is no differentiation of the meristimatic zone in the cortical tissue such as is found in the nodules of other non-legumes. The organism produces a zooglea in the cells which stimulates the nuclei of the host and causes them to divide amitotically. In the spring the cells immediately below the endodermis at the apex of the nodular stele become meristematic and produce new cortical cells in the interior of the old nodes. The other paper on root nodules is by BOTTOMLEY,[23] who finds the nodules on the *Myrica Gale* are also modified lateral roots. These nodules are also caused by *P. radicicola* and each mature nodule shows four zones: (*a*) the apical meristem, (*b*) the infected thread area, (*c*) the bacterial zone, (*d*) the basal zone in which the cells contain oil drops. The bacteria eventually disappear and the basal zone is replaced by the other zones.

A very important contribution to our knowledge of American cecidology is BESSEY'S[24] study of the nematode root knots. This disease is caused by *Heterodera radicicola* (Greef) Mull., and was probably indigenous in some tropical region of the Old World from which it has been distributed throughout the tropics and a considerable part of the temperate zones. Records show that about 480 species and varieties of plants, including nearly all the larger families, are subject to this disease. The life cycle is four weeks or more, dependent on the temperature of the soil. The author gives a good discussion

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[20] KARNY, K. Gallenbewohnende Thysanopteren aus Java. Marcellia **11**:115–169. 1912.

[21] HOUARD, C., Les galles de l'Afrique occidentale française (*V. Cecidies nouvelles*). Marcellia **11**:176–209. 1912.

[22] SPRATT, ETHEL ROSE, The formation and physiological significance of root nodules in the Podocarpineae. Ann. Botany **26**:803–813. 1912.

[23] BOTTOMLEY, W. B., The root nodules of *Myrica Gale*. Ann. Botany **26**:111–117. 1912.

[24] BESSEY, E. A., The root knot and its control. U.S. Bur. Pl. Industry, Bull. 217. 1911.

of the life history of the organism, methods of distribution, and methods of control.

The potato eelworm is the subject of a brief paper by ESSIG.[25] He describes the disease and the organism and suggests treatments. The disease is of such great importance that California has established a quarantine against potatoes from infected districts.

A recent importation from Europe is reported by CRAWFORD.[26] It is *Triozoa alacris* Flor., which causes a rolling and distorting of the leaves of *Laurus nobilis* and other species of *Laurus*.

The olive knot is the subject of a very interesting paper by HORNE[27] This disease is restricted to the olive, and is due to *Bacterium savastanoi* E. F. Smith. It causes knots very similar to the crown gall, but restricted entirely to the branches. It is distributed by means of a slime which oozes from the galls during the rainy weather. Inoculation may occur through natural cracks in the bark.

FAWCETT[28] describes some very interesting citrus galls from Southern California. He believes them to be different from the Jamaica lime and orange knot, which is due to *Sphaeropsis tumefaciens* Hedges.

One of the most interesting cecidia is reported by AMUNDSEN,[29] who found it on wistarias imported from Japan. It occurs on the stems at the base of the buds and in most cases causes the death of the affected buds. Only the pink-flowered plants were infected, and in commenting on this point the author says "whether the fly which laid the eggs discriminated against all the plants which ultimately would produce flowers of other colors and could pick out the pink, or whether the pink varieties were grown in a different locality than the others, could not be ascertained and is still a mystery."

HOUSER[30] describes a gooseberry gall as follows: "The plant is injured by the insect working during the larval stage in the terminal buds of spurs and branches, causing the buds to become abnormal both in size and structure. The bud scales increase greatly in number and size, and lying closely one upon another form a gall somewhat resembling in miniature the pine cone willow galls so commonly encountered upon the tips of willow twigs." Secondary buds are produced and become infected, thus forming a cluster of small cone-shaped galls. The shoots from these galls give a witches' broom effect. The

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[25] ESSIG, E. O., The potato eelworm. Monthly Bull. State Comm. Hort. (Cal.) 1:26–30. 1911.

[26] CRAWFORD, D. L., A new insect pest. *Op. cit.* 1:86, 87. 1912.

[27] HORNE, W. T., The olive knot. *Ibid.* 1:592–600. 1912.

[28] FAWCETT, H. S., Citrus galls. *Ibid.* 1:937–940. 1912.

[29] AMUNDSEN, E. O., Wistaria gall fly. *Ibid.* 1:730–733. 1912.

[30] HOUSER, J. S., The gooseberry gall midge or bud deformer. Jour. Econ. Entomol. 5:180–184.

author also describes the insect, gives its life history, and suggests methods of control.—MEL. T. COOK.

Paleobotanical notes.—Miss HOLDEN[31] has investigated specimens of a conifer from the Trias of New Brunswick which she refers to *Voltzia coburgensis* Schaur. She finds that the foliage of this species is araucarian, the organization of the cone abietineous, and the anatomical structure intermediate between these two groups. This species of *Voltzia*, therefore, represents another early mesozoic form which may be regarded as transition from the Abietineae to the Araucarineae.

Miss BANCROFT[32] has added to the evidence of the uniformity of the mesozoic floras in describing some fossil gymnosperms obtained from the Jurassic of India. The cycadophyte remains are of the *Williamsonia* type, and the vegetative organs show a combination of the characters of Bennettitales and Cycadales.

Miss BANCROFT[33] has described a new stem genus (*Rhexoxylon*) from the later Paleozoic of South Africa. Its general structure suggests relationship with *Medullosa* and *Steloxylon*, and it seems certainly to be an addition to the Medulloseae. A peculiar feature is the character of the inner series of vascular strands, each one consisting of two parts, the outer small and normally oriented, the inner larger and inversely oriented, the two parts being almost in contact. An outer series of strands consists of normally oriented xylem. As contrasted with medullosean stems in general, the wood is compact, the medullary rays are uniseriate, and the pitting of the tracheids is biseriate.

SEWARD and Miss BANCROFT[34] have added to the list of species of Scottish Jurassic plants, describing new species in *Thinnfeldia*, *Brachyphyllum*, *Masculostrobus*, *Conites*, *Strobilites*, and *Cedroxylon*.

SEWARD[35] has published a memoir dealing with two collections of mesozoic plants: the principal one from Afghanistan, made by Mr. H. H. HAYDEN in 1907; the other from Turkistan, made by Mr. GRIESBACH. The composition of the Afghanistan flora is interesting, including the following great groups: Equisetales (several species of *Equisetites*), Filicales (one water fern and several true ferns, including a new genus, *Haydenia*, of Cyatheaceae), Ginkgoales (3 genera), Bennettitales (7 species, among them a new *Williamsonia* and a new *Nilssonia*),

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[31] HOLDEN, RUTH, Some fossil plants from Eastern Canada. Ann. Botany **27**: 243–255. *pls. 22, 23.* 1913.

[32] BANCROFT, NELLIE, On some Indian Jurassic gymnosperms. Trans. Linn. Soc. London II. Bot. **8**:69–86. *pls. 7–9.* 1913.

[33] BANCROFT, NELLIE, *Rhexoxylon africanum*, a new medullosean stem. *Ibid.* 87–103. *pls. 10, 11.* 1913.

[34] SEWARD, A. C., and BANCROFT, N., Jurassic plants from Cromarty and Sutherland, Scotland. Trans. Roy. Soc. Edinburgh **48**:867–888. *pls. 1, 2.* 1913.

[35] SEWARD, A. C., Mesozoic plants from Afghanistan and Afghan-Turkistan. Mem. Geol. Surv. India N.S. **4**: no. 4. pp. 57. *pls. 7.* 1912.